AMENDMENTS TO THE CLAIMS

Please amend Claims 1, 22, 24 and 36, and add Claims 40-41 as follows:

1. (Currently amended) An atomic layer deposition (ALD) process for producing a thin metal silicon oxide ($MSiO_x$) film on a substrate, the process comprising a plurality of consecutive deposition cycles that each deposit only a $MSiO_x$, each cycle comprising:

contacting a substrate in a <u>flow type</u> reactor with a vapor phase silicon compound such that the silicon bonds to the substrate;

contacting the substrate with a vapor phase metal compound such that the metal bonds to the substrate;

converting the bonded silicon and metal compounds into $MSiO_x$ by contacting them with a reactive vapor phase oxygen source; and

purging the reactor with an inert gas after each contacting step and after each converting step.

2. (Cancelled)

3. (Original) The process of Claim 1, wherein the oxygen source compound is selected from the group consisting of water, oxygen, ozone, and hydrogen peroxide.

4. (Original) The process of Claim 1, wherein the metal compound is a metal halide.

5. (Original) The process of Claim 4, wherein the metal compound is hafnium tetrachloride.

6. (Original) The process of Claim 1, wherein the silicon compound is a silicon halide.

7. (Original) The process of Claim 1, wherein the silicon compound is selected from the group consisting of silicon tetrachloride, hexachlorodisilane, and hexachlorodisiloxane.

8. (Original) The process of Claim 1, wherein the deposition occurs at a temperature range of between 150°C and 450°C.

9. (Original) The process of Claim 1, wherein the deposition occurs at a temperature range of between 300°C and 350°C.

10. (Previously presented) The process of Claim 1, wherein the thin $MSiO_x$ film is formed on a hemispherical grain structure.

11. (Original) The process of Claim 1, wherein the substrate is a grooved flat material.

12. (Original) The process of Claim 1, wherein the substrate is a flat material.

13. (Original) The process of Claim 1, wherein the substrate is a bottom electrode of a Dynamic Random Access Memory capacitor.

14. (Previously presented) The process of Claim 1, further comprising depositing a high dielectric constant material over the thin $MSiO_x$ film.

15. (Original) The process of Claim 14, wherein the high dielectric constant material is an oxide of the metal in the metal compound.

16. (Previously presented) The process of Claim 1, wherein the thin MSiOx_film is deposited on a silicon interface to form part of a transistor gate dielectric.

17. (Previously presented) The process of Claim 16, further comprising depositing a high dielectric constant material over the thin $MSiO_x$ film.

18. (Previously presented) The process of Claim 1, wherein the thin $MSiO_x$ film forms an interlayer in a transistor gate oxide.

19. (Original) The process of Claim 1, wherein a ratio of silicon compound contacting steps to metal compound contacting steps during the ALD process is in the range of one to ten and ten to one.

20. (Original) The process of Claim 19, wherein the ratio of silicon compound contacting steps to metal compound contacting steps during the ALD process is one to one.

21. (Original) The process of Claim 1, wherein converting comprises separate oxidation steps following each of the contacting steps.

22. (Currently amended) An atomic layer deposition (ALD) process for producing a thin metal silicon oxide ($MSiO_x$) film on a substrate, the process comprising: consecutively repeating a deposition cycle for depositing $MSiO_x$ until a $MSiO_x$ film of the desired thickness is formed, the deposition cycle comprising:

pulsing a vapor phase silicon compound into a chamber <u>in a flow type reactor</u> such that silicon compound bonds to the substrate;

pulsing a first reactive vapor phase oxygen source into the chamber to convert bonded silicon compound into an oxide;

pulsing a vapor phase metal compound into the chamber such that metal compound bonds to the substrate;

pulsing a second reactive vapor phase oxygen source into the chamber to convert bonded metal compound into an oxide; and

purging the reactor with an inert gas after each pulsing.

23. (Original) The process of Claim 22, wherein the first oxygen source is the same as the second oxygen source.

24. (Currently amended) A method of manufacturing a gate dielectric film comprising a metal silicon oxide ($MSiO_x$) on a substrate <u>in a flow type reactor</u>, the method comprising:

adsorbing a layer of a silicon compound on the substrate in a self-limiting reaction;

adsorbing a layer of a metal compound on the substrate in a self-limiting reaction;

converting the adsorbed silicon and metal compounds into a tertiary metal silicon oxide by contact with a reactive vapor phase oxygen source compound; and

purging the reactor with an inert gas after each contacting step and after each converting step; and wherein the adsorbing and converting steps form a deposition cycle that is repeated multiple times in a row to form the $MSiO_x$ oxide in a layer of a desired thickness.

25. (Cancelled)

26. (Original) The method of Claim 24, wherein the oxygen source compound is selected from the group consisting of water, oxygen, ozone, and hydrogen peroxide

27. (Original) The method of Claim 24, wherein the metal compound is a metal halide.

28. (Original) The method of Claim 24, wherein the metal compound is hafnium tetrachloride.

29. (Original) The method of Claim 24, wherein the silicon compound a silicon halide.

30. (Original) The method of Claim 24, wherein the silicon compound is selected from the group consisting of silicon tetrachloride, hexachlorodisilane, and hexachlorodisiloxane.

31. (Original) The method of Claim 24, wherein the silicon compound is converted into an oxide by contact with a reactive vapor phase oxygen source before the introduction of the metal compound.

32. (Original) The method of Claim 24, wherein the deposition occurs at a temperature range of between 150°C and 450°C.

33. (Original) The method of Claim 24, wherein the deposition occurs at a temperature range of between 300°C and 350°C.

34. (Previously presented) The method of Claim 1, wherein the substrate is contacted with the vapor phase silicon compound multiple times in each deposition cycle.

35. (Previously Presented) The method of Claim 22, wherein pulsing the vapor phase silicon compound and pulsing the first reactive vapor phase oxygen source are repeated multiple times in each cycle.

36. (Currently amended) An atomic layer deposition (ALD) process for producing a metal silicon oxide ($MSiO_x$) film on a substrate <u>in a flow type reactor</u>, wherein the metal silicon oxide is formed from metal oxide and silicon oxide, the process comprising a plurality of consecutive deposition cycles that each deposit only a $MSiO_x$, each cycle comprising:

contacting the substrate with a vapor phase silicon compound such that the silicon bonds to the substrate;

contacting the substrate with a vapor phase metal compound such that the metal bonds to the substrate;

converting the bonded silicon and metal compounds into $MSiO_x$ by contacting them with a reactive vapor phase oxygen source,

wherein the growth rate of the $MSiO_x$ is higher than the growth rate by ALD of the metal oxide and silicon oxide from which the metal silicon oxide is formed.

37. (Previously Presented) The process of Claim 1, wherein the deposition rate of the $MSiO_x$ film is greater than the deposition rate by ALD of silicon oxide or oxide of the metal of the $MSiO_x$ film.

38. (Previously Presented) The process of Claim 22, wherein the deposition rate of the $MSiO_x$ film is greater than the deposition rate by ALD of the individual metal oxide and silicon oxide.

39. (Previously Presented) The method of Claim 24, wherein the deposition rate of the $MSiO_x$ is greater than the deposition rate by ALD of silicon oxide or oxide of the metal of the $MSiO_x$ film.

40. (New) The method of Claim 19, wherein the ratio of silicon compound contacting steps to metal compound contacting steps during the ALD process is two to one.

41. (New) The method of Claim 22, wherein the metal silicon oxide film is stoichiometric.